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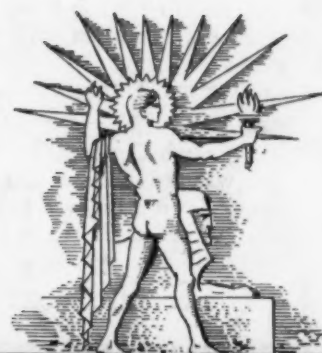
JAN 12 1939

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SCIENCE NEWS LETTER

Quoto

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



January 7, 1939

President, AAAS

See Page 4

A SCIENCE SERVICE PUBLICATION

Do You Know?

Yellowstone National Park boasts over 1,100 different flowering plants, about 500 of which may be in bloom at one time.

Synthetic wool made from casein, by-product of milk, is found capable of taking the dyes used in coloring real wool.

Mosquito larvae are being used in Department of Agriculture laboratories to test the killing power of new insecticides.

Paris has a new Museum of Man, containing exhibits of various races and their customs, and also maintaining laboratories for research work.

The word "hybrid" was originally used by ancient Romans to describe pigs whose fathers were wild boars and whose mothers were tame sows.

The "battleship" in Arizona's petrified forest gets its name because big fossil logs stick out from an eroded formation like guns on a man-of-war.

American steel industry buys \$10,000 worth of platinum and thousands of carats of diamonds a year—for prosaic drilling and testing, not for jewelry.

Although Cortez and perhaps Columbus watched Indians playing with rubber balls, it was over 200 years before any semi-scientific report on rubber and its possibilities was received in Europe.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in *SCIENCE NEWS LETTER* are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

AERONAUTICS

What advantage has the fabric fuel tank over a metal one? p. 8.

Why are present air records unlikely to be far outdistanced? p. 12.

ANTHROPOLOGY

Where was Pocahontas kidnapped? p. 8.

BIOLOGY

How can the minute objects of the world between the living and the inanimate be photographed? p. 11.

BOTANY

How long can dead plant cells go on making food? p. 8.

CHEMISTRY

How can buildings be protected against incendiary bombs? p. 9.

GENERAL SCIENCE

How have scientific findings been misapplied in world affairs? p. 4.

In what fields is the new president of the American Association for the Advancement of Science prominent? p. 4.

What is the common meeting ground for science and religion? p. 10.

ICHTHYOLOGY

How do fishes change their color? p. 13.

MENTAL HYGIENE

How can men reach a new understanding of man? p. 5.

How can social customs cause mental breakdown? p. 14.

What good purpose is served by the propagandist? p. 5.

What type of migration benefits the new country? p. 6.

MEDICINE

How can a person be made immune to insect bites? p. 7.

What deadly snake poison is used for the relief of pain? p. 11.

Why are young girls most likely to develop tuberculosis? p. 8.

Why is it important to grow worms in test tubes? p. 7.

PHYSIOLOGY

What effect has cigaret smoking on blood pressure? p. 9.

PSYCHOLOGY

How can man's mental maladjustments be prevented? p. 3.

Why do men and rats suffer nervous breakdown? p. 3.

Why does mental coin flipping differ from actual chance? p. 12.

An electric heater for outdoor commercial clocks has been developed.

A new wood and plastic product results in a wood that will not chip or crack or burn.

Scientists have found altogether 35 different species of fossil penguins, types that lived long ago.

The Food and Drug Administration is attacking the use of bottles and other containers that are so shaped as to seem larger than they are.

The first baby chinchillas born in England are reported to be thriving.

Berlin is to have a museum of medical history, like the Wellcome Museum in London.

The rare rock rhododendron, a dwarf species, is being safeguarded in the Siskiyou National Forest in Oregon.

To brighten up the dinner plate, potatoes are now being produced in colors: red, pink, blue, yellow, russet, purple, as well as white with blue or red eyes.

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PSYCHOLOGY

Neurotic Rats Bring Dr. Maier \$1000 Award of A.A.A.S.

Animals Suffer Nervous Breakdown When Forced to Act In Situation Where Every Act is Wrong; Like Humans

FOUR rats won the thousand-dollar prize of the American Association for the Advancement of Science for Dr. Norman R. F. Maier, of the University of Michigan, by having a nervous breakdown when they were forced to act when confronted with a problem which they could not solve. (*SNL*, Dec. 31, '38)

By showing just what causes nervous breakdown, these rats may enable physicians to make a new attack on human mental disease with new hope for prevention and cure.

For the breakdown of Dr. Maier's rats is strikingly like that of men. We also break down, Dr. Maier said, when we are confronted with a "do something" situation and know that whatever we do will be wrong.

Dr. Maier's rats were first taught to face a situation intelligently. Two cards were set up, with food behind one of them. If they jumped at the right card they got the food, if they jumped at the wrong one, all they got was a thump on the nose and a fall into a net. They soon learned the distinction between "right" and "wrong" in these simple terms of reward and frustration.

Then disorder was introduced into their little world. Sometimes the food was put behind the "wrong" card, and a jump at the "right" card resulted in the fall into the net. Or the "right" card was omitted entirely and only the "wrong" one was left for them to jump at.

In the face of this confusion, the rats hesitated to act. They would refuse to jump for as long as a quarter of an hour. But action was forced on them by means of a blast of air and a disturbing noise. In some of the experiments, the situation was still further complicated by penalizing the wrong decision with a slight electric shock.

The rats simply "went batty." They ran around in circles. They lunged half-heartedly at the baffling cards instead of jumping straight at them, so they fell in any event. They fought the electric wires. One of them developed pronounced neurotic symptoms. It became inert, would not move when picked up and handled,

left its legs in the positions where the experimenter poked them, was glassy-eyed. Nevertheless it ate well, and lived out a normal rat's life-span of about two years.

The general moral of the story is that with rodents and also with our two-legged selves, nervous breakdown comes when no choice is the right choice, yet action is compelled.

If we know what we have to do, even if that means going to the electric chair, we may develop tensions and fears, but we do not "lose control of ourselves" by becoming neurotic wrecks. Unsolvable problems bring breakdowns only when they must be solved.

Watching the drama of nervous breakdown as portrayed in motion pictures of Dr. Maier's experiments, scientists fairly gasped.

"He's got something there!" one psychologist explained.

"Psychiatrists can't fail to recognize in these symptoms true mental abnormality," another commented.

Dr. Maier's rats are not the first animals to develop nervous symptoms when placed in conditions of mental strain, but never before has any animal been seen in a state so close to what physicians see in human patients suffering from mental disease or nervous breakdown.

Now, if confirmation of Dr. Maier's experiments proves that nervous breakdown or mental disease can be definitely attributed to a certain set of laboratory-controlled conditions, mental diseases in humans can be attacked with a new understanding and with renewed hope for prevention and cure.

Science News Letter, January 7, 1939

PSYCHOLOGY

Prize Winner Glad That Rats Can Serve Mankind

By **DR. NORMAN R. F. MAIER,**
Of University of Michigan

THE demonstration of neurotic behavior in the rat extends the field of psychiatric investigation to an animal which is not only relatively simple but



DR. NORMAN R. F. MAIER

one whose behavior has been more extensively investigated than that of any other animal below man. The use of the free situation rather than the conditioned response method extends the range of neurosis producing situations and makes possible the more complete analysis of psychological conflicts.

Since many lines of investigation are not open to research workers utilizing human beings as subjects, animal neurosis actually places the study of behavior abnormality on a broader scientific basis. Paradoxically enough, the psychiatrist is pleased when he cures a neurosis, whereas the psychologist is rewarded for creating it.

The important first step has been the presentation of convincing evidence of true and intense abnormal behavior which could be distinguished from the heightened nervous tension or fear. Once having learned how to produce that behavior, work on its cure can be more effectively begun.

Psychologists are only too happy if the rat which they truly love can be of service to mankind. It is hoped that this work will bring psychiatrists and psychologists closer together so that they can work toward a common end.

Soon we will have to face the task of correcting our environment so that neurosis-producing conflicts can be eliminated. Then we will not have to worry so much about correcting man's maladjustments.

Science News Letter, January 7, 1939

GENERAL SCIENCE

Physiologist Named President Of American Association

Prof. Walter B. Cannon Noted for Research on Glands And Active in Fight for Freedom of Scientific Work

See Front Cover

SOcially conscious scientists, who represent a rapidly growing wing of organized researchers, now have among their number the president of the largest general scientific organization in the United States, the American Association for the Advancement of Science.

He is Prof. Walter B. Cannon, eminent Harvard physiologist, elected at the Richmond meeting of the A.A.A.S.

Actively identified with the campaign to send American doctors, nurses and medical supplies to war-torn Loyalist Spain, Dr. Cannon is co-chairman of the North American Committee to Aid Spanish Democracy and the Medical Bureau to Aid Spanish Democracy, leading pro-Loyalist groups. He has joined in militant anti-fascist activity since he became chairman of the Medical Bureau when it was founded in November, 1936.

Dr. Cannon, who is 67, is an international figure in the world of science. Since 1897, the year after he graduated from Harvard but before he finished his medical course, he has done outstanding original work in the field of physiology.

He has made important contributions to knowledge of digestion, the nervous system, the ductless glands and the effects of emotion upon bodily processes.

He showed that in rage, fear or anger, the emotions which prepare the animal for flight or fight, the digestive and sexual functions are immediately inhibited and the adrenal glands pour into the

blood large quantities of one of their hormones, adrenalin or epinephrin. As a result of this adrenal action, sugar is mobilized from its storage place in the body to counteract the effects of muscular fatigue, and the clotting time of the blood is speeded up. All this instantaneous preparation gives the animal or man a "wonderful capacity for offense, defense, flight, and repair of injured tissues."

During the World War, Dr. Cannon, working with another physiologist, developed the gum acacia treatment of shock.

Since then he has discovered a new hormone, sympathin, which is produced by smooth muscle, and has an effect on the body similar to epinephrin.

Recent investigations have been on the sympathetic nervous system and on high blood pressure.

Besides conducting original scientific investigations, Dr. Cannon has been a leader in medical education and in the fight for the freedom of medical research.

His term of office as president of the A.A.A.S. follows that of Prof. Wesley C. Mitchell, Columbia economist, the first social scientist in many years to head the A.A.A.S. The elections of both men call attention to the significant advance in scientists' interest in every day affairs and in what the world does with their inventions and discoveries.

A close friend of Premier Juan Negrin of Loyalist Spain, Dr. Cannon has served

the Loyalist aid organizations actively. He is also chairman of the Boston Chapter of the national organization of which he is one of the heads. Speeches by him on behalf of the Loyalists have received wide circulation in pamphlet form.

A recent gift of nicotinic acid, new pellagra treatment, to Premier Negrin, though paid for by 39 scientists, was sent in Dr. Cannon's name. Premier Negrin is also a well-known physiologist. The nicotinic acid gift provides the first occasion on which the treatment, which has thus far given encouraging results, is being tried on a large scale. Pellagra is a diet deficiency disease, common in America's south and from which thousands of Madrid residents are suffering.

Science News Letter, January 7, 1939

GENERAL SCIENCE

Dangers Seen in Applying Science to Human Affairs

AS the economic and political conditions of the world become more disturbed, there is a tendency to look more and more to science for factual and social guidance. In many cases, especially where sharply delineated areas of non-emotional activity are concerned, scientific facts and procedures are directly helpful and pertinent without any major dangers.

The world has seen some shocking misinterpretations or perversions of science, such as the race doctrine of the Nazis, the misconception of thermodynamical principles called technocracy, the empirical materialism that flourishes in Moscow, and the more wide-spread idea that Darwin's "survival of the fittest" justifies war.

There has been great concern in scientific circles over such dangers, coupled with a feeling that scientists themselves should do something about this problem of science's social aspects. Aside from the scientists who are emphatic and adamant in holding to the idea that science should not concern itself with applications or difficulties in politics, religion, etc., there are also highly competent experimentalists who feel strongly that in social application scientists should be sure that haste is made slowly.

This viewpoint is put neatly by Prof. G. A. Boutry of Paris, who contends that a proposed scientific experiment must be considered in the light of whether it has any limitations, whether it can be stopped and started again at will, and whether it will endanger in any way the human commonwealth already acquired.

It is evident that caution is necessary,

• Urges Spirit of Truth Seeker

Dr. Walter B. Cannon, Harvard physiologist, elected president of the American Association for the Advancement of Science at its Richmond meeting, issued at the request of Science Service the following inaugural statement, to his fellow scientists and the public:

"Thousands of teachers and investigators in all aspects of scientific endeavor have abundant opportunities for diffusion of the spirit of the truth seeker—a spirit much needed in our distressed world. It stands for tolerance as opposed to bigotry, for the welfare of all mankind as opposed to exclusive national and racial interests, for fighting the foes of humanity—misery, ignorance and disease—as opposed to human slaughter by human beings who abominably pervert scientific discoveries. I honestly express the hope that the coming year may see both noteworthy progress in science and a wider spreading of the scientific spirit."

Prof. Boutry observes. The experiments of a mathematician are dangerous only to his paper supply. Those of a physicist or chemist may raise the roof of his laboratory and reduce him to small particles. Those of a biologist or pathologist may be fatal to thousands of people. Wars have shown that mistakes in the

science of ruling nations have led to the death of millions and the misery of generations. They may be dangerous to the spiritual qualities of mankind, about which we know next to nothing.

All of which are good reasons why careful and competent studies of social relations of science should be pursued.

Science News Letter, January 7, 1939

MENTAL HYGIENE

Must Work Fast To Beat Forces Returning Us To Middle Ages

Scientists Warned at Mental Health Symposium That Psychiatrists Should Unite With Social Scientists

SCIENTISTS studying the conduct and mind of man must push their work forward fast if they are to outdistance the "forces that now threaten to herd us back into the middle ages."

With this warning, Dr. Harry Stack Sullivan, President of the William Alanson White Psychiatric Foundation, Washington, D. C., summarized the reports at a special session of the Symposium on Mental Health held in connection with the meeting of the American As-

sociation for the Advancement of Science in Richmond.

"We have come a long way indeed," said Dr. Sullivan, "from the days, now reappearing in Europe, when everyone had to subscribe to an official account of what is right to believe and proper to do."

"The spirit of free inquiry is especially profitable in terms of human happiness when it brings about the union of the psychiatric and the social sciences."

"Man is far more a product of culture, of the forces that make up civilization, than is he a creature of the natural science."

"We need to know all that we can learn about his heredity, physical make-up, nutrition, and physiology. But even more important in these days of alarm and excursion, of international misdemeanor and crime, we must hurry to an understanding of man living as a person among others."

Neither psychiatry alone, nor the social sciences alone can hope to solve current urgent problems, Dr. Sullivan said.

"By a pooling of techniques, however, and a redefinition of fields, a great deal can be accomplished quickly," he said.

Bodyguards To Be Obsolete

PROPHECY that political leaders armed with bodyguard and machine gun will some day be as obsolete as is now a physician loaded with ropes and manacles for restraint of disordered minds, was voiced by Dr. Harold D. Lasswell, of the University of Chicago and the White Psychiatric Foundation.

Manacles and ropes were discarded by the psychiatric pioneer, Dr. William Alanson White, when he saw that force was a substitute for thought.

This has now become a truism in the hospital. The attitude may become more general among leaders in business and party life, Dr. Lasswell said.

"Methods can be perfected of exploring the distribution of discontent among large numbers of persons, and of controlling such reactions," he declared. "Too often it is true that responsible leaders are stamped by their personal anxieties, into costly and dangerous means of coping with collective insecurities."

Propagandists are useful to both leaders and followers, Dr. Lasswell said.

"When the Great Depression struck, millions of people were cast into the discard heap of the unemployed. These millions had been educated to have faith that the world would reward them if they worked. Propagandists diverted their aggressions away from themselves and supplied a new sense of self-esteem by absolving them from blame, and encouraging them to take a hand in the preparation of a better world."

"Isolated crimes against persons and property were reduced by enabling the masses to discharge their insecurities in parades, meetings, and discussions."

The propagandists, catering to the



THIAMIN

The chemical model of vitamin B₁ is here being shown by F. J. Ruland (left) and W. O. McCarthy to Miss Alys d'Avesne at the Merck and Company exhibit at the meeting of the American Association for the Advancement of Science. Above may be seen part of a photomicrograph of the crystals themselves.

masses, also contributed to the mental health of the leaders.

"Men who held responsible positions suffered severely in self-deference when their leadership seemed to have brought society to the very slough of economic disorganization. Like generals in a defeated army, some took to suicide. But many found at least temporary surcease from anxiety by projecting blame upon the 'agitators.'"

Physicians have found, Dr. Lasswell pointed out, that in treating a patient consideration must be given also to his family, his friends, and the community as a whole where conditions may be found that contributed to the individual's disease.

Political scientists can aid psychiatrists by giving them an understanding of powerful forces for mental health or illness as they occur in the state.

Germany May Lose

THE MASS migration of Jews from Germany may be expected to result in severe loss to that country and in a net gain to the nations to which they migrate.

This conclusion may be drawn from a report by Dr. J. D. Reichard, senior surgeon of the U. S. Public Health Service, who has studied and examined immigrants to this country.

People usually migrate because they have not enough to eat and they hope to find a region with a better, or more easily obtainable, food supply, Dr. Reichard said. Such migrations have a complicated result in the country to which the people move. It is the less successful who are "squeezed out" of the old group, but the more aggressive of the submerged groups succeed in migrating and establish themselves in the new region.

But religious and political pressure tend to give good elements to the new community, Dr. Reichard declared. He cited the settlement of the Pennsylvania German regions in the 18th century as an important migration motivated by religious difference. The large German migration into the United States following the failure of the liberal movements of 1848 was politically motivated.

"Political and religious migrations have usually caused loss to the old country of energetic, intelligent, enterprising stock," Dr. Reichard said. "For example, the forced migration of the Jews and Moors from Spain had a profoundly harmful effect on the scientific, economic and social life of that country."

Man is one of the most inveterate of

migrants in all the animal and plant world, Dr. Reichard indicated. The universal tendency has been one of interbreeding.

"Racial purity," therefore, is a concept that has no place in scientific thought," he said. "It is an artificial concept, fostered by political leaders in an attempt to increase cohesion within the group and to increase national consciousness. 'Historical studies show that there has always been interbreeding of peoples with constantly changing racial characteristics. The thesis that there is a fundamental, biological difference between various political groups, and its corollary, that certain of these political groups are biologically superior to others, must be regarded as delusions," he declared.

The basis for anti-Semitism is probably largely economic, Dr. Reichard said.

"With an interest in finance and trade acquired by contact with and absorption of Phoenician groups, the Jew early acquired a skill in business which enabled him easily to dominate this field.

"This domination created a threat against the economic security of his Gentile neighbors and gave rise to hostile attitudes and activities.

"The influence of these attitudes and activities on the mental hygiene of both Jew and Gentile has had a profoundly harmful and demoralizing influence."

Another potent source of unhealthy mental attitudes is the threat to the security of the established groups in the new country of immigration of large masses of aliens, Dr. Reichard indicated.

"The fear of a lowering of economic status leads promptly to aggressive sadistic, paranoid attitudes," he warned and cited as examples from United States history the Ku Klux Klan, the Know Nothing Party and the American Protective Association, and the anti-Japanese movement.

"There is, of course, a reciprocal response in the alien group which leads to the establishment of a tradition of persecution and a tendency to magnify injustices and handicaps.

"This tradition has been strongly developed in many Jewish groups as a result of centuries of persecution and discrimination. There has resulted a feeling of group insecurity, which is not being allayed by present developments in Europe."

In general, immigration raises problems in the new country for both old and new residents, but these complications may be stimulating and healthful, Dr. Reichard concluded.

"In so far as we are able, we should prevent a volume of a widely different cultural group so great as to lead to a debacle," he advised. "We should, however, regard immigration as one of the great vivifying influences in the development of civilizations, and one which, whatever its immediate effects may be, finally helps to develop better cultural conditions and better mental hygiene."

Must Not Forget Man

THE tendency of scientists to become engrossed in the facts of their own particular field to the exclusion of the broader meaning of their findings was deplored by Dr. Edward Sapir, Sterling professor of anthropology and linguistics at Yale University.

The college professor earning \$1500 a year, the farmer getting only \$500, and the bank vice-president making \$500,000 are more than just parts of a table of statistics of income, as they may seem to the economist. They are men with diverse problems arising from these particular incomes.

Professors who earn only \$1500 a year must go in for plain living and high thinking, Dr. Sapir said. Unless they have good health and are happily married and intelligent, it will be hard for them to stave off that corroding envy of the banker which "is not very good for either the digestive tract or the personality organization."

The farmer on \$500 is too busy to know whether his health is good or bad or whether he is happily married or not, he went on. "It is only when the sober, inevitable, corroding impoverishment of the farmer's personality is lit up by some spectacular morbidity of sex or religion that the psychiatrist or novelist or poet is attracted to him."

The banker probably has his troubles, too.

Perhaps he too inclines to suffer from an economic ill—that obscure, perverse, guilty feeling which, the psychiatrist tells us, so often festers in one's heart of hearts when one tries to balance one's usefulness to society with the size of one's income."

Economic laws must not be allowed to seem more "real" than certain people who try to make a living. Otherwise, he warned, if we do not "value the nuclei of consciousness from which all science, all art, all history, all culture, have flowed as symbolic by-products in the humble but intensely urgent business of establishing meaning- (Turn to page 14)



BEARDED PLANT

Donald P. Murrill of the University of Richmond and R. E. Alley, Jr., of Princeton are among those who inspected the exhibit at the AAAS of Drs. P. W. Zimmerman and A. E. Hitchcock of Boyce Thompson Institute for Plant Research. Roots growing from the tip of this plant developed as a result of growth substances applied in the form of a salve.

MEDICINE

Produces Immunity Against The Bite of Wood Ticks

"Vaccinations" on Guinea Pigs First Demonstration That Animals Can Become Immune to Insects as to Germs

SUCCESSFUL "vaccination" against ticks, carriers of deadly Rocky Mountain spotted fever and cause of another disease, tick paralysis, has been achieved by Dr. William Trager, of the Rockefeller Institute at Princeton, N. J.

The "vaccinations" were made on guinea pigs, but presumably attempts will be made later to apply the method to dogs, cattle and even humans.

The work, reported to the American Association for the Advancement of Science at Richmond, furnishes, Dr. Trager said, the first experimental evidence that an animal like a guinea pig can become immune to a blood-sucking arthropod (insects, spiders and crustaceans are all arthropods) as well as to a disease germ.

Dr. Trager's discovery shows also that the classical conception of immunity or

resistance to disease germs can be extended to still another group of parasites, because, as in the case of germ-resistance or immunity, tick-resistance or immunity is a result of the defensive action of antibodies and white blood cells.

When a tick attaches itself to a "vaccinated" or immune guinea pig, a mass of these white blood cells surrounds the mouthparts of the tick and the skin of the guinea pig thickens and begins to grow beneath this mass of white blood cells.

"A larval tick attached at such a point," Dr. Trager said, "is unable to feed and soon dies and drops off the host." The immunity, as Dr. Trager sees it, depends essentially on the presence in the blood of the class of germ-fighters known as antibodies, which speed up mobilization of the other germ-

fighters, the white blood cells, which in turn wall off the tick from its source of supply of blood.

"Vaccination" of the guinea pigs against ticks was done by injecting under their skin an extract of larval ticks or of the salivary glands of adult ticks.

Guinea pigs also acquire what is termed natural resistance or immunity to ticks after one infestation with the larvae of ticks themselves. The immunity is not confined to the region of infestation but rapidly becomes generalized throughout the body. Blood serum from guinea pigs with this type of immunity when injected into other, non-immune, guinea pigs makes them also able to resist ticks.

Grow Worms In Test Tubes

A STEP toward the more adequate understanding of the minute parasites that damage the health of animals and human beings has been taken through the successful "in vitro" cultivation in the laboratory of the twisted wire worm of sheep and other cud-chewing animals.

Achieving success where others had failed, Drs. R. W. Glaser and Norman R. Stoll of the Rockefeller Institute for Medical Research laboratories at Princeton, N. J., reported that they had raised this worm, scientifically known as *Haemonchus contortus*, through the four larval stages. A germ-free diet, consisting of liver extract, agar, rabbit kidney and killed yeast, was made available in test tubes to the worm eggs carefully made germ-free by sterilizing agents. In this way the worms were taken through their two free-living stages. These test-tube worms, when fed to a three-months-old, bottle-raised lamb which was worm-free, produced a normal infection of the worm parasites.

Using a slightly different food medium, the worms were carried through the two further larval stages, which are parasitic. Adult worms have not yet been grown in the test-tubes but Drs. Glaser and Stoll are confident that these will be obtained with some further slight modification of the nutritional environment.

The worm used in the experiments has a development very similar to that of the hookworm which causes serious human disease.

"The successful in vitro culture of the parasitic worms," the scientists declared, "should lead to a more adequate understanding of their physiology and to further elucidation of (Turn to page 10)

BOTANY

Dead Plant Cells Continue Food Manufacturing Process

GREEN cells of plants need not be alive to carry on the manufacture of food substances out of carbon dioxide and water, it is indicated in experiments reported by Prof. O. L. Inman of Antioch College (*Science*, Dec. 9). Prof. Inman conducted his work as part of the research program of the C. F. Kettering Foundation for the Study of Chlorophyll and Photosynthesis.

Cells using carbon dioxide in food manufacture indicate that the process is going on by giving off oxygen in the presence of light. Using delicate chemical and bio-assay tests, Prof. Inman was able to show that oxygen was produced from the green content squeezed out of living cells, and also from cells that had been killed by freezing. In no case, however, was this post-mortem "vital" activity of the cells very long-continued.

Science News Letter, January 7, 1939

MEDICINE

Protecting Young Women Against Tuberculosis

GIRLS and young women between the ages of 15 and 25 years are and apparently always have been more likely to die of tuberculosis than any other group in the population. Many theories have been evolved to explain the situation and to provide the basis for preventive efforts.

Among the theoretical causes, familiar to the young women themselves, who hear them in parental admonitions, are the diet fad and desire for a slender figure; flimsy dress; cigarette smoking; excesses of the "jazz age;" and the increasing industrialization of women.

All these can be thrown out, it appears from studies conducted by Edna E. Nicholson for the National Tuberculosis Association. Miss Nicholson has talked to close relatives and friends of all the young women dying of tuberculosis in Detroit and New York City in a certain year. She found out how these girls and young women dressed, what they ate, how much sleep they got, how much they earned if employed, whether they were married, how much schooling they had, and many other things about their lives before they got tuberculosis and died.

Her studies show that the reason for the high tuberculosis mortality among girls and women of this age group is

simply that they are girls and women of this age. The psychic and physical changes of adolescent and early adult life in girls cause them to be unusually susceptible to tuberculosis.

The tuberculosis death rate will probably always be higher among this group than any other in the population, Miss Nicholson says, but many lives can be saved by recognizing the fact that these young women are unusually susceptible, and by having them examined regularly and carefully to detect the first signs of the disease so that proper care can be promptly started.

Science News Letter, January 7, 1939

ANTHROPOLOGY

Indian Skeletons at Scene Of Pocahontas Kidnaping

THE INDIAN town from which Pocahontas was kidnaped by the English in 1612 has been located, and is being excavated by Dr. T. D. Stewart, Smithsonian Institution anthropologist.

Identifying the place by aid of Capt. John Smith's map of Virginia, Dr. Stewart says there is no doubt this was Patowomeke on the Potomac River west bank, where lovely Pocahontas was hidden by her father after Capt. John Smith left Jamestown. Indian fears that Pocahontas might be seized as a valuable hostage to the English proved well founded, when Capt. Argall used an Indian to lure the Indian maid away from Patowomeke, and held her captive until her father ransomed her by an exchange of English prisoners.

It was during this captivity, says Dr. Stewart, that Pocahontas fell in love with John Rolfe, whom she married.

Archaeologists have long known that a large Indian town existed at the site now identified as Patowomeke. Excavations there by Judge W. J. Graham, about a year ago, brought to light hundreds of Indian burials, including the biggest normal human skull that has ever been found. It is possible that this giant-brained Indian was alive at Patowomeke when Pocahontas plunged the town into international complications.

Dr. Stewart has now traced the outline of the town by imprints of holes where the stockade ran. Patowomeke was the biggest Indian town in Virginia. Its buildings were presumably flimsy log huts covered with bark.

Skeletal remains found by Judge Graham are being studied by Dr. Stewart, who says they appear to be typical of the Algonquian Indians.

Science News Letter, January 7, 1939

IN SCIENCE

AERONAUTICS

Fabric Fuel Tank Is Announced by Glenn Martin

SUCCESSFUL development of fabric fuel tanks for airplanes is announced by the Glenn L. Martin Company, well-known manufacturers of flying boats and bombing planes.

Practically indestructible by vibration, in contrast with the metal tanks now in standard use, the new tanks are also "leak resistant," the fabric tending to close up to slow loss of fuel. Leaks can be repaired as easily as a leak in an automobile tire's inner tube.

Known as the Mareng fuel cell, the tank is made of fabric impregnated with synthetic rubber. Ordinary rubber is dissolved by gasoline, but the synthetic variety is not. Each fuel cell is actually made a little larger than the compartment into which it is placed, in order that, even when it is full, the fabric will not be stretched.

The Mareng cell successfully withstood 700 hours of violent vibration, still being gas-tight when engineers finally stopped trying to wear it out.

Its ability to slow leakage of gasoline when punctured, as, for example, by a machine gun bullet, is illustrated in the experience of an unnamed pilot flying a Mareng-cell-equipped Martin plane in an unnamed war, according to the company's statement. His fuel tank pierced by bullets, he was still able to fly 100 miles back to his base for a safe landing and repairs. After the repair, the tank was as good as new, it was claimed.

Science News Letter, January 7, 1939

CHEMISTRY

Dean At Minnesota To Head Chemical Society

DR. Samuel Colville Lind, dean of the Institute of Technology of the University of Minnesota, has been elected president of the American Chemical Society to take office in 1940. Dr. Lind assumed the title of president-elect on January 1, 1939, at which time Prof. Charles A. Kraus of Brown University became president.

Science News Letter, January 7, 1939

NE FIELDS

CHEMISTRY

British Chemists Develop Incendiary Bomb Proof Paint

A MINERAL paint that has been found to check damage from incendiary bombs has just been produced from the research laboratories of Imperial Chemical Industries, it is reported.

Beams, joists and floors coated with it were indicated by tests to resist the intense heat of a small thermite bomb until it exhausts itself. At a demonstration by the chemists, it was indicated that the flame of a one-pound bomb could consume the attic of a house in 30 minutes. The same type structure coated with the new mineral paint will survive, scorched but intact, after the bomb has burned itself out in 10 minutes.

The mixture is said to be cheap and can be painted on one-sixteenth of an inch thick with a single application and still be effective.

According to military authorities, a rain of small incendiary bombs, as many as 10,000 at a time, is more likely in war than the use of heavy incendiaries. The Home Office tested the new mineral coating by firing light incendiary bombs of the type likely to be used in war, at the same velocity as they would have if dropped from an airplane. The objective was a home selected for the purpose and it was found that after passing through the tiles, bombs would penetrate no further than the first wooden floor. Further research is now in progress to make floors of offices, art galleries and other large public places also fireproof.

Science News Letter, January 7, 1939

ARCHAEOLOGY

Egyptian Art Used Assembly Technique

EGYPT'S sculptors used to assemble statues. They could even split a statue job in half, we are told, and one man could produce the right half of a wooden or stone god, while the other turned out the left. And the resulting figure appeared with eyes that matched, cheeks equally rounded, both ears at the same height!

This was possible, of course, because

Egyptian art cared little for perfect likenesses, but aimed to produce standard or ideal features. In technique, this art foreshadowed our machine age, showing what remarkable precision could be achieved by human hands wielding simple tools.

One particular statue vastly impressed the Greek historian Diodorus, writing in the first century B.C. about "ancient sculptors." In some detail, he described a wooden Apollo carved by Egyptian brothers, for the people of Samos, Sicily. One brother worked in Samos, the other in Ephesus; and "the statue was divided in the middle, each part exactly matching the other at every point."

Scholars have marveled over this, explaining it as best they could. The latest explanation makes the Egyptian art stunt really believable. A British writer says that the statue mentioned by Diodorus was marked off into 21 parts with a small plus section, which allowed for hair or headdress. This was one Egyptian system for drawing human body proportions. The sculptor would mark the units on his block of wood or stone, then draw in the profile and cut away surplus material.

The brother sculptors, trained by the same master, knew so well what their Apollo should look like, that they could produce the halves as readily as two people might draw halves of a circle. And if the system failed at any point, the British writer explains, the irregularity could be smoothed off when Apollo was finally glued together.

Science News Letter, January 7, 1939

GENERAL SCIENCE

Carnegie Corporation Distributed \$3,830,135

THE Carnegie Corporation of New York distributed \$3,830,135 "for the diffusion of knowledge" in the United States and the British dominions and colonies during the fiscal year 1937-38, Frederick P. Keppel, president of the corporation, announced.

Grants made totaled 224 out of 1,329 proposals for aid submitted to the corporation. Recipients of the Carnegie funds included Radcliffe College, Barnard College, Columbia University's School of Library Service, Committee on Scientific Aids to Learning of the National Research Council, Princeton University, Phillips Academy, American City Planning Institute, Brookings Institution, Rockford College and Antioch College.

Science News Letter, January 7, 1939

PHYSIOLOGY

Cigaret Smoking Causes Rise in Blood Pressure

SMOKING cigarettes raises the blood pressure in both normal persons and in patients suffering with high blood pressure, Drs. E. A. Hines, Jr., and Grace M. Roth of the Mayo Clinic found in a study of 86 persons.

The effect of tobacco smoking on blood pressure is not due entirely to the action of a stimulus on specially sensitive blood vessel systems. Part of the effect, at least, is the result of some element in the tobacco smoke which causes constriction of the blood vessels. This element in the tobacco smoke was not identified in the report made by the two scientists at a recent staff meeting of the Clinic.

The rise in blood pressure following smoking was greater in high blood pressure patients than in normal persons except in the case of high blood pressure patients who had never smoked before. This latter difference is attributed to the fact that inexperienced smokers do not inhale as much smoke as regular smokers.

The test was made by having each person, after a 30-minute rest, smoke two cigarettes of a standard brand. Blood pressure and pulse rate were watched during the smoking and for a few minutes afterward. As a control, each person went through the same procedure except that he puffed at an unlighted cigarette.

The results were also compared with results of the cold pressor test, in which one hand is immersed over the wrist in a bucket of ice water. The blood pressure response to this test indicates whether or not a person has an especially sensitive, or hyperreactive, as scientists call it, blood vessel system. The excessive rises in blood pressure from smoking, the scientists found, occurred only in the patients who had, according to the cold pressor tests, hyperreactive blood vessel systems.

Science News Letter, January 7, 1939

GEOGRAPHY

American Geographical Society Has a New Director

DR. John Kirtland Wright has been appointed Director of the American Geographical Society. Dr. Wright has been librarian and research editor of the Society since joining the staff in 1920.

Science News Letter, January 7, 1939



BRAIN DEMONSTRATION

Attracting considerable attention at the AAAS exhibits was this model of the brain with electric buttons in the different centers, each of which would light up the corresponding activity illustrated in a panel of photographs. Joseph A. Bracco of the New York Museum of Science and Industry is shown demonstrating the exhibit.

From Page 7

the mechanism of immunity developed against helminths by their hosts."

This means that it will be possible to raise parasitic worms and experiment with them much as cultures of bacteria are handled in research laboratories.

Men Against Toothaches

A DEVOTED band of men against toothaches sat in an all-day session at the Richmond meeting, discussing that painful problem of dental caries or tooth decay. The problem is painful in more than the literal sense of aching teeth, because in spite of a vast amount of research scientists have unfortunately not yet found a way to prevent caries.

Two new ideas have recently been added to the older ones about causes of caries. The condition runs in families, U. S. Public Health Service scientists have reported. Brothers and sisters of children with caries, in a group of over 4,000 given careful dental examinations, have more than twice as much caries as brothers and sisters of the children examined and found free from caries. This suggests that there is an inherited tendency, but the federal health service

scientists are not yet ready to give any specific explanation for the familial differences.

Fluorine in the water, cause of the ugly tooth condition of mottled enamel, may provide protection against caries, another group of U. S. Public Health Service scientists suggest. They found a higher percentage of children had no caries in communities where the domestic water supplies contain higher concentrations of fluorides than in communities using waters of lower fluoride concentrations.

The fluorine may not be the substance responsible for the difference. Reporting the U. S. Public Health Service findings, Dr. H. Trendley Dean suggests that some other constituent of water may play a role.

Just how fluorine, if it is fluorine, protects teeth from decay is not known, but if this proves to be a fact the means of preventing tooth decay would be relatively simple. Communities have already stopped the ravages of mottled enamel by changing their water supplies. Adding fluorine would be simple enough.

Mottled enamel would not be the necessary price to pay for such a method of caries prevention, either. Dr. Dean's

studies showed that even where the amount of fluorides in the water was too small to cause mottled enamel, the children's teeth were free from caries.

Diet as a cause of tooth decay was discussed at length. Latest angle on this is the idea that diet does not cause decay because of its composition, acting through the body chemistry, but because of its physical character, acting mechanically. Coarse particles of food are blamed for causing caries, according to this theory.

Reporting studies on this line, Dr. C. A. Lilly and associates of the University of Michigan asserted:

"In our studies of between 1,500 and 1,600 rats over a period of six years, unquestionable dental caries has never occurred, regardless of what diet was fed, if the diet was kept absolutely free of coarse hard particles."

Scientists Must Help World

IT IS the duty of scientists "to assist in the establishment of a rational and harmonious social order out of the welter of human conflict into which the world has been thrown through the release of uncontrolled sources of industrial production and lethal weapons."

This is the message brought to the American Association for the Advancement of Science by Sir Richard Gregory, Bart., for many years editor of the British science journal, *Nature*.

Exalted spiritual ideals combined with research results in fields of natural knowledge, Sir Richard believes, will give scientific guidance towards individual fitness and also towards a higher human perfection and social life "which will make the world truly a celestial dwelling place."

Man's future is here on earth, Sir Richard indicated.

"Science is concerned with the progress of knowledge and the evolution of man not only in the past but also in the present and future," he said. "The idea that such development is possible is relatively modern. The chief philosophers of ancient Greece held that the Golden Age was in the past and that mankind was receding from it; and the same view of human decadence is given Biblical authority in Genesis. It is quite possible that some savages have fallen from a higher to a lower level of savagery, but this is an unusual course to follow. We need not believe that man has degenerated from a state of perfect knowledge to that of being 'born in sin and shapen in iniquity,' or that the recovery of his

lost position must be looked for not in this world but in the next. The adoption of the degradation doctrine is opposed to evolution as a whole and subservient to all progress."

Science and religion meet on common ground in the pursuit of truth and its influence upon human life and conduct, Sir Richard said, whatever differences of opinion may exist as to their respective fields.

"Men of science are citizens as well as scientific workers," Sir Richard emphasized. "They are beginning to realize their special responsibilities for securing that the fruits of scientific knowledge are used for human welfare. They can no longer remain indifferent to the social consequences of discovery and invention, or be silent while they are blamed for increasing powers of production of food supplies, providing means of superseding manual labor by machines, and discovering substance which can be used for destructive purposes. It would be a betrayal of the scientific movement if scientific workers failed to play an active part in solving the social problems which their contributions to natural knowledge have created.

"The view that the sole function of science is the discovery and study of natural facts and principles without regard to the social implications of the knowledge gained, can no longer be maintained. It is being widely realized that science cannot be divorced from ethics or rightly absolve itself from the human responsibilities in the application of its discoveries to destructive purposes in war or economic disturbances in times of peace. Men of science can no longer stand aside from the social and political questions involved in the structure which has been built up from the materials provided by them, and which their discoveries may be used to destroy."

Can Photograph Viruses

THROUGH the use of the new electron microscopes scientists are nearing the day when they may be able actually to photograph objects in the border zone of nature between the living and the dead.

The technique of using electron beams to disclose tiny details in nature, far beyond the limits of any microscopes using light in the usual way, is rapidly being perfected, Dr. V. K. Zworykin of the Radio Corporation of America reported.

"It can be shown that, even taking account of certain fundamental defects of electron lenses, electron microscopes are

essentially capable of resolving separations of the order of 0.000001 millimeters," said Dr. Zworykin.

This resolution, amounting to a millionth of a millimeter, reaches down into the size of the super giant molecules which have been shown to be present in some of the filterable viruses, particularly the virus causing tobacco mosaic disease. Some of these molecules have weights 25,000,000 times greater than ordinary molecules of common chemical elements.

The essential point about these huge chemical molecules of the viruses is that they are believed to represent the borderline, in nature, between animate and inanimate matter.

Although the viruses, at least some of them, have been shown to be chemical in nature, they have been found to be capable of reproduction and possess biological activity which has always been associated only with living things.

Scientists are not yet seeing much borderline matter in the scale of living with their electron microscopes, Dr. Zworykin indicated, but they may be just on the experimental threshold of doing it. The electron microscope is able potentially to do the job. It only remains to iron out the experimental kinks in the observing and photographing system.

German scientists using electron microscopes are now studying colloidal suspensions and have reported the separation of detail spaced only one hundred-thousandth of a millimeter apart (0.00001).

The use of electron microscopes in the study of extremely minute particles has so far found its best use in studying the surfaces of glowing metal filaments of electric lights and in analyzing crystal structure in thin films of metals.

Much more difficult is the study of biological specimens. The swift-flying electrons used in electron microscopes can not only kill biological specimens but can actually destroy them. Care must be taken, therefore, to preserve their initial appearance if only for the brief instant while they are having their "picture" taken.

Cobra Venom Relieves Pain

RELIEF of the severe pain of cancer, tic douloureux, locomotor ataxia and a number of other conditions without any dulling or depressing effect on the mind, but, on the contrary, with a stimulation of intellectual processes—these are the effects chalked to the credit of cobra venom in a report by Dr. David I.

Macht and his son, Moses B. Macht, of the pharmacological research laboratory of Hynson, Westcott and Dunning at Baltimore.

Although cobra venom is a poison, the Baltimore scientists report that it can be safely given in sterile solution in suitable doses.

Nearly two-thirds of a group of patients suffering from advanced cancer were relieved of pain by the venom. Small doses of it have also been given to patients suffering from chronic arthritis, neuritis and neuralgia, particularly tic douloureux, locomotor ataxia and Parkinson's disease. At least half these patients derived some relief of pain, Dr. Macht and his son report.

Physicians using the venom reported not only a relief of their patients' pain but a brightening of their minds. At first this was thought to be the indirect result of the relief of pain. Psychological studies which the Machts report seem to show that the venom may actually stimulate the mental processes.

Tests of normal persons to whom cobra venom had been given showed an improvement of mental activity. Injections of morphine, codeine, dilaudid and heroin in these subjects, on the other hand, uniformly prolonged the reaction time of all the subjects with regard to mental arithmetic. These persons also did better on coordination tests after doses of cobra venom but did less well after morphine or other opiates. The field of vision, especially for green, was widened or extended after doses of cobra venom, the Machts report, but narrowed after morphine.

From these and other studies including animal investigations, the Machts conclude that cobra venom achieves its pain-relieving effect by its action on the central nervous system, particularly the brain.

For relief of pain, the Baltimore scientists report, cobra venom is slower than morphine, but its effect lasts longer.

Rate of Genius Production

GREAT geniuses and men with the capacity to amass great fortunes crop up in the population in about the same manner, stated Carl Snyder, general statistician of the Federal Reserve Bank of New York, before an audience of his fellow statisticians. Their numbers tend to follow what is known as the Pareto curve.

This curve, named for the Italian-French statistician who first worked it out, was originally an expression for the

numerical relation between sizes and individual numbers of money incomes in a population. Mr. Snyder stated that the same numerical relations seem to apply to outstanding abilities in other realms besides money-getting, whether in sports, science, or the arts.

Air Records Near Limit

RECORD-SEEKING airmen, who have steadily pushed upward speed, range and altitude marks during the 35-year history of aviation, are now closely approaching the theoretical limits of the airplane as we know it today, Prof. William F. Durand of Stanford University, pioneer aeronautics student and former chairman of the National Advisory Committee for Aeronautics, told the American Association for the Advancement of Science.

Airplanes will not be able to climb much beyond 60,000 feet, he predicted. Only a few weeks ago an Italian flyer pushed a specially designed aircraft beyond 56,000 feet. He himself and others who may go after the record are thus narrowed within a band in the atmosphere about 4,000 feet deep.

Two British bombers which recently flew more than 7,000 miles to set up a new distance mark closely approach the 8,000 to 9,000 mark limit, Dr. Durand indicated. This performance is comparatively not so good as some of the other marks, but "when we realize, however, the remote chance, for a period of 60 to 80 hours (the period of flight), of a complete absence of all adverse weather conditions and a continuous perfect functioning, during this period, of all factors contributing to the desired end, the larger margin between actual and ideal performance is not surprising."

If everything, such as load-carrying ability and range, is sacrificed to speed, the scientist said, a speed of about 500 miles an hour should be possible. Already the record is within shooting distance of this mark. The record is now 440.8 miles an hour. But the plane that made it, an Italian seaplane, sacrificed everything to its engine; only room enough for a pilot and a few gallons of fuel for the speed dash was left in the plane.

Mental Coin Flipping

COIN flipping, if done only in the mind, will come out very differently from what happens when the actual metal coin is tossed.

This fact, with bearing on the out-

come of radio telepathy tests and the answers given by students in college examinations, was reported by Dr. Louis D. Goodfellow, of Northwestern University.

When a coin is tossed the chances are fifty-fifty that a head will turn up. But the chances that a person will call heads is not .50 but between .76 and .79, Dr. Goodfellow said. Perhaps our habit of saying "heads-tails," never "tails-heads," accounts for this difference.

On the second toss the chances are still .50 that heads will come up, but the probability of a person's calling heads again is about .57.

On the third toss heads have still a .50 chance, despite popular belief, but chances of the individual's calling heads have now dropped to about .44.

So if you are making up an examination and want the answers "yes" or "no" to come in a chance order, use your fingers, not your mind, to flip the coin, Dr. Goodfellow advised.

Girls Not Clairvoyant

CLAIRVOYANCE is apparently not among the talents of the students at Florida State College for Women.

To test ability to tell, without looking, the symbols on the faces of the "ESP" cards which have been used in an attempt to discover clairvoyance at Duke University, 735 Florida girls made a total of 225,000 judgments concerning the order of a shuffled deck containing two of the "ESP" suits.

Details of the test were reported by Drs. J. H. Heinlein and C. P. Heinlein.

When the girls' judgments were compared with those of two electrical spin-

ner-robots "guessing each other," 5,000 times, it was established that these girls are no more clairvoyant than the robots.

As a further test, 300 students were asked to perceive clairvoyantly and in correct order a series of 25 words that had been selected from a college standard dictionary.

In 7,500 judgments, not one student discriminated as much as one single word correctly, the report stated.

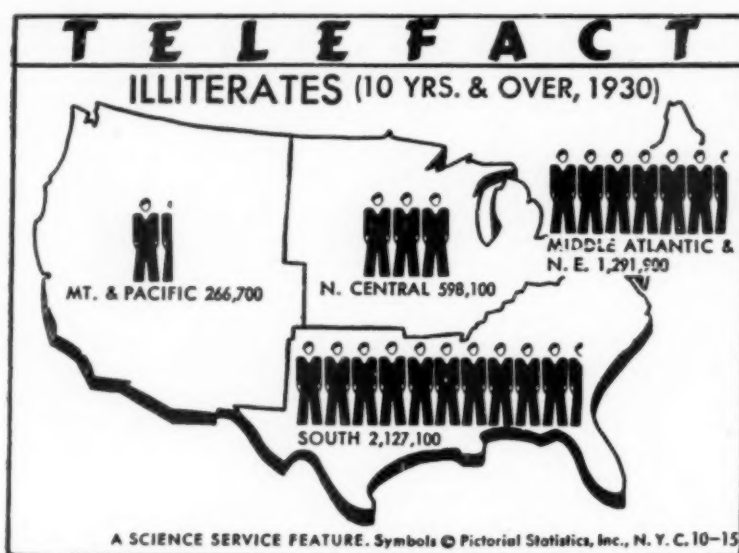
Histamine in White Cells

SCIENTISTS seeking to unravel the mysteries of fatal leukemia and of conditions associated with asthma, hay fever and food sensitivity have new clues to follow as a result of recent discoveries about a body chemical, histamine. The studies, by himself and other scientists, were described by Dr. Charles F. Code, of the University of Minnesota Medical School, when he was presented the Theobald Smith Award for research in medical sciences.

One of these discoveries is that histamine is a normal constituent of the white cells of the blood. The particular blood cells known as granular leucocytes are the source of this chemical in the blood.

Relatively enormous quantities of histamine are found in the blood of patients suffering from one type of leukemia, in which these granular leucocytes are present in large numbers. Patients suffering from lymphatic leukemia, on the other hand, have normal amounts of histamine in their blood.

The relationship between high histamine content of the blood and increased



numbers of granular leucocytes is not clear, Dr. Code said, and requires further study.

More than one kind of granular leucocyte is present in blood. When these were tested separately, it was found that the increased quantities of histamine were associated with increased numbers of cells called eosinophils. An association between these cells and diseases like asthma, hay fever and food sensitivity has been previously discovered. Here again, Dr. Code pointed out, scientists do not yet know whether or not there is any causal relationship between the increased quantities of histamine and increased numbers of eosinophils.

When dogs suffer anaphylactic shock, the histamine content of their blood increases sharply as the sensitizing agent causing the shock, like pollen causes hay fever, spreads through the body. Large amounts of histamine appeared in the blood of guinea pigs during the height of bronchial spasm or asthmatic attack, and injections of histamine can bring on anaphylactic shock in these animals.

Blood of horses having anaphylactic shock, with symptoms like those of the condition known as "The Heaves," and blood of calves with "Bloats" was tested. No increase of histamine was found, but this does not mean, Dr. Code said, that histamine was not liberated during the attacks. The results simply show that it did not accumulate in the peripheral blood.

Simplified Literature

SIMPLIFIED and condensed versions of various selections from the classics do not lose the inspirational and informational content of the original, experiments reported by Prof. Francis P. Robinson, Ohio State University psychologist, indicate.

Using extracts from the Bible, the Peace Pact and Gibbons, the tests were made on teachers, college and high school students. Prof. Robinson came to the conclusion that not only are well-written simplifications not inferior but they will in many cases increase the comprehension of its readers.

Meek Hens Made Bullies

THE meekest hen in the chicken yard, picked on by all of her sisters, was turned into a feathered bully who pecked all her erstwhile persecutors, simply by having a little of the male sex hormone, testosterone, injected into her veins. She even crowed.

This phenomenon of the chemical conversion of submission into aggression was brought about not once but several times, in experiments reported by Prof. W. C. Allee and Nicholas Collias of the University of Chicago.

Hens, like other birds, have what is known as a peck order. That is, in every flock, there is one hen who can peck all the others without getting pecked back. There is likely to be one at the bottom, whom all the others can peck and who never pecks back at anyone. Between them are all degrees of pecking and being pecked. By conferring a little temporary maleness on the tail-enders in this peck order, the two zoologists enabled them to assert themselves and rule the roost.

Robin Skin Grafted

BITS of skin from an embryo robin were grafted onto a chick before hatching in a very delicate operation reported by Dr. Mary E. Rawles of the University of Rochester. A square of the eggshell was removed, the tiny oblong of robin skin inserted into an incision made with a glass needle into the developing chick within, and the piece of eggshell replaced and sealed on with paraffin. Incubation was then continued until the chick hatched.

At hatching, the chicks, which were white leghorns, had extensive areas of colored down ranging from blackish brown to pale cinnamon brown. In the one chicken that grew up, the influence of the robin graft was marked in the color of mature feathers. Their shape, however, was typically chicken, not resembling that of robin feathers. Distribution of the pigment in the feathers, also, was characteristic of chicken and not of robin.

Animal Color Changes

ANIMALS that change color were the subjects of reports at a special symposium.

Prof. G. H. Parker of Harvard University opened the discussion by nominating certain fishes, such as flounders, and some of the higher mollusks like octopuses and squid, as among the champion color-changers. Their peculiar ability was known even in ancient times, for Aristotle describes the color changes of a flounder swimming over a mottled bottom in terms so detailed that it seems evident he watched the fish himself.

In modern times it has been discovered that these color changes are due to

the expansion, contraction, and migration of certain special cells called chromatophores, and that they are governed by light reaching the eyes of the animals and profoundly influenced by the secretions of certain glands.

That there is a direct quantitative relation between the amount of light received by the eye and the kind and extent of color change by the animal affected was reported by Dr. F. B. Sumner of the Scripps Institution of Oceanography. In a typical experiment, numbers of fish were kept in bowls with five brightnesses of background, ranging from black through three grays to white, under uniform lighting conditions. After several months the fish were killed and subjected to microscopic examination for degrees of color development. A fairly definite relation was found between their light-environment and their color development.

Dr. Dietrich C. Smith of the University of Maryland School of Medicine found that fish scales retained their power to change color for some hours after removal from the fish, if they were kept in the right kind of solution. In this state, they responded to various chemical treatments. When potassium salts were added, the pigment bodies were concentrated, and they scattered on the addition of sodium salts. Adrenalin caused concentration, ergotoxin reversed this effect.

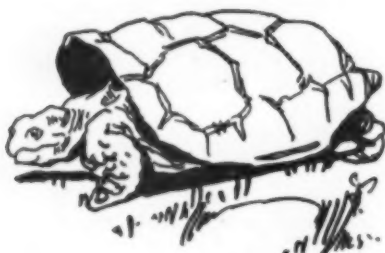
Probe Solar Energy Limits

ANOTHER day of pioneer research in astronomy has been ended, it was disclosed at the scientists' meetings by Dr. Arthur Adel of Lowell Observatory, Flagstaff, Ariz.

For years astronomers have been pushing farther and farther out into the invisible infra-red radiations of the sun searching for comparative intensities at various wavelengths. With each new advance in detecting means the solar energy curve has been pushed further.

Today Dr. Adel announced that for the first time the energy curve of the sun's radiation had been obtained out to the wavelength 14 μ , or 140,000 Angstrom units, where the search must end because beyond that point the atmosphere begins to absorb the rays.

The pattern of the solar energy at these very long wavelengths corresponds to that produced by a black body having a temperature of from 6,000 to 7,000 degrees Kelvin, or over 12,000 degrees Fahrenheit.



"That Which Is Tired"

THERE has been a great deal of discussion about the use of the words tortoise, turtle, and terrapin. Dr. Raymond L. Ditmars, noted student of reptiles, has handed down a ruling. Tortoises are the land-living forms, he says, and the name turtle should be reserved for the kinds that spend a large part of their time in the water. Terrapins of course are the particular tortoises that have a high reputation as "quality eats."

It is a little unfortunate that the confusion between tortoise and turtle should have arisen, for both words are originally the same. They come from the old French *tortue*, and back of that from the Latin word meaning twisted. The reference apparently is to the peculiarly turned feet of the tortoise of Mediterranean lands. Nor has turtle, as applied to our small friend in armor, anything to do with turtle, as applied to a dove. The turtledove's name comes from the Latin *turtur*, an obvious imitation of its own cooing note.

What impels us towards special friendship for the little tortoise that strolls on stumpy legs through the garden is not easy to guess. Perhaps, though, it is the fascination of something quite unlike ourselves yet still a living being. Per-

haps, too, there is the slight psychological elation we feel, unconsciously in the main, at our superiority over a creature so awkward and helpless-looking and so obviously harmless. Anyway, we do like him; and the Southwestern Indians' humorous name proves that the Indians liked him, too. They called him "That Which is Tired."

There is one belief about reptiles in general that has lately been proven quite false, and it may be of benefit to have it still more widely known, for the well-being of lizard, or snake, or tortoise that your children may capture and want to keep in a box for a while.

Whatever they do with their captives, do not let them put the poor thing in the full glare of the summer sun. The old idea that reptiles love to "bask" is only half true—and the higher-temperature half may result in a small tragedy if believed in too implicitly.

A California scientist, Dr. Walter Mosauer, has tried penning rattlesnakes and other kinds of serpents on bare rock and soil, so that they cannot find shade anywhere, and then leaving them to the full sunlight. Far from enjoying it, they soon show signs of discomfort, and presently die. They may like to bask in the sun when the weather is still cool, but there can be too much of a good thing. So if your kids decide to make pets of either Slip, the Lizard, or Slithery, the Snake, or That-Which-Is-Tired, see that they are not kept caged where the sun is too hot.

Science News Letter, January 7, 1939

From Page 6

ful relationships between actual human beings, we commit personal suicide."

Education Methods Blamed

OUR present educational methods were blamed for crime, marital unhappiness, and mental illness by Lawrence K. Frank, of the Josiah Macy, Jr.,

Books

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Foundation in New York before the Symposium on Mental Health at Richmond.

"It is becoming clear," he said, "that the delinquents and criminals, the mentally sick, the sex offenders, prostitutes, celibates, unhappy wives and husbands, the harassed, insecure business men, politicians, professional workers, and those who are ill from anxieties and repressed feelings that they have turned against their own organ systems, are in most cases the products of the present educational programs in our homes and schools."

"They are the unhappy, frustrated anxious babies of yesterday, the misunderstood and neglected school children of yesterday, the bewildered and rebellious adolescents of yesterday, who are now expressing in these different ways what they suffered during their childhood and youth."

Mental hygiene gives no support for the doctrine of complete lack of restraint for the child, he said, but all the necessary deprivations and prescriptions should be made emotionally acceptable to the child since our whole social, economic and political organization is based upon learning these lessons without either resentment to endanger society or anxiety to defeat, if not destroy, the individual.

"The democratic aspirations of man cannot be achieved so long as individuals are warped, distorted and mentally sick," he declared, "since only the sane, integrated personalities, who have learned to accept themselves, can show that understanding and tolerance that is necessary to a democratic society."

"Whatever fosters and promotes mental health will guard and further democracy."

Social Customs Important

SOCIAL conditions may contribute to an individual's mental breakdown when the social institutions are such that

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the individual is humiliated, shamed, and rejected, Dr. Ruth Benedict, associate professor of anthropology at Columbia University told the symposium.

In attempting to find out what social conditions detract from mental health, the student of human psychology cannot do as the great physiologist Pavlov did with his dogs. Humans cannot be experimentally confronted with conditions that may cause mental breakdown.

The anthropologist can discover the information, however, by studying a variety of cultures to discover which customs and institutions are associated with a healthy people and which are accompanied by mental ill-health.

Cultural institutions have everything to do with whether an individual experiences a long series of humiliations even though he lives up to the demands of the mores, or whether he experiences humiliations only if he becomes a moral reprobate, Dr. Benedict said.

"In our own culture in certain cases and on certain income levels, as also in some primitive societies, an adolescent's economic dependence upon his parents is humiliating, while on the contrary in numberless cultures the child figures as the hope and future of the family and humiliation on this score is unthinkable."

When individuals are unnecessarily humiliated and for circumstances beyond their control, such as birth or poverty, they develop feelings of inadequacy that lead to mental breakdown.

Science News Letter, January 7, 1939

ANTHROPOLOGY

Patterns

● "The ancestry of Navajo silver ornament forms had its root in the silver trade jewelry distributed to the tribes east of the Mississippi River after 1750, and in the Mexican-Spanish costume ornaments and bridle trappings of the late 18th and early 19th centuries . . . Silver working by the Navajo themselves was learned from Mexican silversmiths, the first dated reference of such a smith in the Navajo country being November, 1853."—Arthur Woodward, in *NAVAJO SILVER* (*Northern Ariz. Soc. of Science and Art*).

Science News Letter, January 7, 1939

Who is Right About

MARGARET SHEA GILBERT'S

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•First Glances at New Books

Archaeology—Ethnology

THE SKY-RELIGION IN EGYPT, ITS ANTIQUITY AND EFFECTS—G. A. Wainwright—*Cambridge (Macmillan)*, 121 p., plates, \$2.75. The author presents evidence for the theory that an archaic religion persisted in Egypt, forcing a number of Pharaohs into the role of divine agents for weather control, and leading the unfortunate kings to their death.

Science News Letter, January 7, 1939

Engineering

WHAT ENGINEERS DO; ENGINEERING FOR EVERYMAN (Rev. ed.)—Walter D. Binger—*Norton*, 304 p., \$2.75. A survey of civil engineering, covering materials, structures, sanitary engineering and other phases of the work.

Science News Letter, January 7, 1939

Physics

THE HYDROGENATION - CRACKING OF TAR. Part IV. THE PRODUCTION OF AROMATIC HYDROCARBONS FROM PHENOLS AT ATMOSPHERIC PRESSURE—H. E. Newall—*Brit. Lib. of Inf.*, 55 p., 40c.

Science News Letter, January 7, 1939

History

HISTORY OF THE PACIFIC COAST OF NORTH AMERICA—John Walton Caughey—*Prentice-Hall*, 429 p., \$4.50. A nicely written text dealing vividly with the development of the West from Panama to Alaska. It is the first book to relate this particular segment of history, with the exception of Bancroft's 39-volume work.

Science News Letter, January 7, 1939

Education

A STUDY OF EDUCATION IN THE CIVILIAN CONSERVATION CORPS CAMPS OF THE SECOND CORPS AREA—Samuel F. Harby—*Edwards*, 264 p., \$1.50. An analysis of the situation in CCC camps, with suggestions for change in policy to make education, rather than work, the primary goal of the camps. The camps are found offering unique educational possibilities, with a chance to conserve human as well as natural resources.

Science News Letter, January 7, 1939

Anthropology

THE POTTERY OF SANTO DOMINGO PUEBLO—Kenneth M. Chapman—*Laboratory of Anthropology, Santa Fé, N. M.*, 192 p., illus., \$4. Color plates, many of them, are a feature of this monograph. The beautiful Indian designs shown in such quantity and soft colors have proved a hard problem for the

author. Four times the monograph has been printed, in the effort to show the precise tones of buff and brownish red seen on the Indian wares. The text analyzes the technology and decoration of the pottery.

Science News Letter, January 7, 1939

Hygiene

INDUSTRIAL HYGIENE — Laurence B. Chenoweth and Willard Machle—*Crofts*, 235 p., \$2. Designed as a text for students of engineering and industrial hygiene, the book should, as the authors hope, be helpful to engineers and plant managers by providing both specific, practical information and also a general conception of the entire problem of industrial hygiene.

Science News Letter, January 7, 1939

Bibliography

OCCUPATIONS AND VOCATIONAL GUIDANCE; A SOURCE LIST OF PAMPHLET MATERIAL (3rd ed.)—Wilma Bennett, comp.—*Wilson*, 160 p., \$1.25.

Science News Letter, January 7, 1939

General Science

YEAR BOOK NO. 37—*Carnegie Institution of Washington*, 432 p., \$1, paper, \$1.50 cloth. See SNL, Dec. 17.

Science News Letter, January 7, 1939

Engineering

FUNDAMENTAL ELECTRONICS AND VACUUM TUBES—Arthur Lemuel Albert—*Macmillan*, 422 p., \$4.50. This text, one of the Engineering Science series, starts with a comparatively brief treatment of fundamental electronics and deals principally with the engineering of the many uses to which electrons in vacuum tubes have been put.

Science News Letter, January 7, 1939

Archaeology

THE GILDING PROCESS AND THE METALLURGY OF COPPER AND LEAD AMONG THE PRE-COLUMBIAN INDIANS — Paul Bergsøe—*Danmarks Naturvidenskabelige Selskab, København*, 58 p., 5 plates, 2 kroner. Finding a large quantity of half-finished objects in Ecuador enabled Dr. Bergsøe to reconstruct the metallurgical processes known to Indians in that region. This publication, the second, deals with pre-Columbian lead and explains the technique of gilding copper.

Science News Letter, January 7, 1939

Technology

FOUNDRY WORK—William C. Stimpson and Burton L. Gray—*Amer. Tech. Soc.*, 216 p., \$2.

Science News Letter, January 7, 1939

Engineering

AMERICAN HIGHWAYS AND ROADSIDES—Jac L. Gubbels—*Houghton*, 94 p., illus., \$2.75. This book covers the principles of location and construction of the modern highway, the road off which you can run at a thirty degree angle, cross the "cradle rocker" drain and strike the fence without danger of turning over. Layout, landscaping and safety practices are explained.

Science News Letter, January 7, 1939

Archaeology

TYPOLOGY OF LITHIC ARTIFACTS—E. B. Renaud—*Texas Archeological and Paleontological Society*, 35 p., 55c. Under a technical sounding title, Prof. Renaud has written a plain and easily understood lesson in the logical classification of stone arrow points, grinding stones, and other implements. It is intended to help students and amateur archaeologists.

Science News Letter, January 7, 1939

Botany

TREE GROWTH — Daniel T. MacDougal—*Chronica Botanica, Leiden, and Stechert, New York*, 240 p., \$4.50. Records of a great deal of painstaking and ingenious work, by a pioneer in the exact quantitative study of growth rates in woody plants. It constitutes the first volume in a new series of books on plant science, to be published under the editorship of Frans Verdoorn.

Science News Letter, January 7, 1939

Anthropology

THE SHERBRO OF SIERRA LEONE—H. U. Hall—*Univ. of Pennsylvania*, 51 p., illus., \$2. A preliminary report on an expedition to West Africa in 1937. Secret societies are an outstanding feature of the life described.

Science News Letter, January 7, 1939

Technology

PATTERN MAKING—James Ritchey—*Amer. Tech. Soc.*, 233 p., \$2.

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Engineering

A. S. T. M. STANDARDS ON TEXTILE MATERIALS—*American Society for Testing Materials*, 323 p., \$2.

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Anthropology

ANTHROPOMETRY OF THE OVIMBUNDU, ANGOLA—Wilfrid D. Hambly—*Field Museum of Natural History*, 79 p., 30 plates, \$1. Measurements of males in this West African tribe are reported and compared with data on adjacent tribes.

Science News Letter, January 7, 1939